



King's Research Portal

DOI:

[10.1007/s11031-018-9693-3](https://doi.org/10.1007/s11031-018-9693-3)

Document Version

Peer reviewed version

[Link to publication record in King's Research Portal](#)

Citation for published version (APA):

Chan, C. S., Van Tilburg, W. A. P., Igou, E. R., Poon, C. Y. S., Tam, K. Y. Y., Wong, V. U. T., & Cheung, S. K. (2018). Situational meaninglessness and state boredom: Cross-sectional and experience-sampling findings. *MOTIVATION AND EMOTION*, 42(4), 555-565. <https://doi.org/10.1007/s11031-018-9693-3>

Citing this paper

Please note that where the full-text provided on King's Research Portal is the Author Accepted Manuscript or Post-Print version this may differ from the final Published version. If citing, it is advised that you check and use the publisher's definitive version for pagination, volume/issue, and date of publication details. And where the final published version is provided on the Research Portal, if citing you are again advised to check the publisher's website for any subsequent corrections.

General rights

Copyright and moral rights for the publications made accessible in the Research Portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognize and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the Research Portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the Research Portal

Take down policy

If you believe that this document breaches copyright please contact librarypure@kcl.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.

[This paper was accepted for publication in Motivation and Emotion]

Situational Meaninglessness and State Boredom: Cross-Sectional and Experience-Sampling Findings

Christian S. Chan

The University of Hong Kong

Wijnand A. P. van Tilburg

King's College London

Eric R. Igou

University of Limerick

Cyanea Y.S. Poon, Katy Y.Y. Tam, Venus Wong, and S. K. Cheung

The University of Hong Kong

Author Note

Christian S. Chan, Cyanea Y.S. Poon, Katy Y.Y. Tam, Venus Wong, and S. K. Cheung,
Department of Psychology, The University of Hong Kong, Pokfulam Road, Hong Kong. Wijnand A.
P. van Tilburg, School of Psychology, King's College London, London, United Kingdom. Eric R.
Igou, Department of Psychology, University of Limerick, Castletroy, Limerick, Ireland.

Correspondence concerning this article should be addressed to Christian Chan, Department of
Psychology, The University of Hong Kong, Pokfulam Road, Hong Kong. Email: shaunlyn@hku.hk

Abstract

Theories of boredom assert that boredom is a product of situational meaninglessness. We conducted two studies to test if the perceived meaningfulness of a situation is associated with state boredom, above and beyond sadness, personality traits, and boredom proneness. In Study 1, 105 participants (72.4% female; mean age = 33.9 years, $SD = 17.5$) described situations in which they experienced boredom, no boredom, engagement, or sadness. They then rated the level of state boredom, sadness, and meaninglessness that they experienced in that situation. As hypothesized, state boredom was associated with situational meaninglessness, before and after controlling for sadness. In Study 2, 148 participants (73.0% female; mean age = 19.2 years, $SD = 1.8$) first provided baseline data on personality traits and boredom proneness. Through a smartphone app-based experience-sampling method, they then responded to a brief questionnaire multiple times a day, across seven days. The questionnaire asked about the nature of their current activity, whether the activity was done alone or with other people, and their affective state. Results from multilevel modelling of 3,022 entries suggest that perceived meaningfulness of the activity was negatively associated with state boredom, above and beyond sadness, personality, and boredom proneness. We also found that being with others during the activity acted as a moderator; activities lower in perceived meaningfulness were associated with higher ratings of state boredom when done with others than when done alone. These results demonstrate that perceptions of meaninglessness characterize state boredom.

Keywords: boredom proneness, state boredom, meaning, existential psychology, experience sampling

Situational Meaninglessness and State Boredom:

Cross-Sectional and Experience-Sampling Findings

Boredom is a universal and prevalent emotion that people experience in everyday life. Theoretical explorations (e.g., Barbalet, 1999) and empirical studies (e.g., Fahlman, Mercer, Gaskovski, Eastwood, & Eastwood, 2009; Van Tilburg & Igou, 2012, 2017a) converge to suggest that boredom may involve the lack of perceived meaning in the task at hand. The bulk of the existing literature focuses on overarching life meaning and boredom proneness. It remains unclear whether situational, task-specific meaning is related to state boredom. The current study aimed to address this gap by examining the association between moment-to-moment meaning appraisal and state boredom using experience-sampling methods.

Boredom as a Distinctive Emotion

Boredom is defined as an aversive experience people have when they want, but are unable, to engage in a satisfying activity (Eastwood, Frischen, Fenske, & Smilek, 2012). When bored, people are unable to engage attention with the boredom-inducing stimulus or situation, are aware of the fact that they fail to do so, and that they attribute the cause of boredom to external factors, such as the lack of stimuli (Eastwood et al., 2012; Smith & Ellsworth, 1985).

Although boredom shares some experiential components with other emotions, it is a distinct affective state (Goldberg, Eastwood, LaGuardia, & Danckert, 2011; Parkhurst & Hopmeyer, 1999; Van Tilburg & Igou, 2012, 2017a). As with sadness, boredom is unpleasant (Van Tilburg & Igou, 2012). As with happiness and pride, bored people anticipate expending very little effort while being certain about the situation they are experiencing (Smith & Ellsworth, 1985). Boredom is also correlated with apathy, anhedonia, and depression in varying degrees (Goldberg et al., 2011).

Boredom is distinct from other emotions in its totality, that is, when the central features of boredom are considered. Van Tilburg and Igou (2012) noted that boredom has a stable set of feelings, cognitions, thoughts, motivations, action tendencies, and expressions that differ from other negative

emotions. In particular, they found that boredom differs from anger, sadness, and frustration in that it makes people feel unchallenged. More recent work evidences that boredom is different from many other negative emotions, especially with regard to a sense of purposelessness combined with attentional disengagement (Eastwood et al., 2012; Van Tilburg & Igou, 2017a). In terms of psychophysiological responses, heart rate, skin conductance levels, and cortisol levels associated with boredom are discriminative from other emotional states (Merrifield & Danckert, 2014). Furthermore, Wallbott (1998) found distinct bodily gestures for boredom relative to other negative emotions. Although boredom does resemble other aversive emotional experience in terms of affective components at face value, it is a distinct emotion.

Boredom: State Versus Proneness

Researchers have studied both the propensity to experience boredom—boredom proneness—and state boredom (Greenson, 1953; Neu, 1998; O'Connor, 1967). Propensity for boredom is a quality a person possesses that predisposes one's vulnerability to experience boredom. It connotes individual differences in how a person reacts across situations and how easily one perceives a situation as boring. It is a relatively stable and chronic characteristic (Ng, Liu, Chen, & Eastwood, 2015).

State boredom, however, is situation based. It is typically momentary and transient (Fisher, 1993; Mikulas & Vodanovich, 1993). A bored state is often brought about by activities or situations that are perceived as dull, monotonous, repetitive, and perceived by the individual as purposeless and unchallenging (O'Hanlon, 1981; Van Tilburg & Igou, 2012). When one remains in a boring situation, attention tends to drift away (Eastwood et al., 2012); one may become restless and frustrated (Farmer & Sundberg, 1986); time may be perceived to be dragging and passing slowly (Martin, Sadlo, & Stew, 2006).

Boredom proneness and state boredom are related yet distinct constructs. Studies that measured both have found that the strength of their association is moderate (Fahlman, Mercer-Lynn, Flora & Eastwood, 2013; Mercer-Lynn, Bar, & Eastwood, 2014). Furthermore, Mercer-Lynn and colleagues (2014) found that boredom proneness predicted state boredom above and beyond

boredom-inducing experimental condition, suggesting that people with higher boredom propensity are more likely to experience state boredom. Boredom proneness and state boredom are intertwined, and their relationship needs to be examined closely.

Boredom proneness is not the only factor predicting state boredom. Studies have found that the importance of situational factors, above and beyond personal predisposition, in causing state boredom (Chin, Markey, Bhargava, Kassam, & Loewenstein, 2017; Mercer-Lynn et al., 2014). In theory, boredom proneness constitutes the disposition of a person, which can manifest in terms of the frequency of experiencing boredom (Elpidorou, 2014). However, this has yet to be demonstrated empirically. To date, no studies have employed a measure of boredom proneness (e.g., Boredom Proneness Scale; Farmer & Sundberg, 1986) to predict the frequency of state boredom across multiple time points and occasions.

Boredom and Meaning

Prior to the advent of “boredom” emerging as a common experience, “acedia” was the term to describe a state of meaninglessness, especially among monks and nuns and nobilities (Altschule, 1965; Svendsen, 2005). This terminological predecessor of boredom as well as boredom itself have been argued to be products of a lack of meaning (Fahlman et al., 2009; see also Coughlan, Igou, Van Tilburg, Kinsella, & Ritchie, 2017), but boredom in this regard was more akin to a general dissatisfaction than a moment-to-moment feeling.

With rising number of boredom research in recent years, many studies have investigated on the predictors of boredom proneness (e.g., Gerritsen, Toplak, Sciaraffa, & Eastwood, 2014; Isacescu, Struk, & Danckert, 2016); yet, there are few empirical studies on the causes of state boredom. This might be due to methodological difficulties in conducting laboratory studies, such as documentation of sequential emotion change, individual difference in boredom propensity, and controlling for emotions other than boredom.

More recently, researchers have begun to make advances in this area. One study established failure in sustained attention as a cause of state boredom, by documenting temporal changes in state

boredom during an attention task (Hunter & Eastwood, 2016). Lack of meaning has also been long held as a cause of boredom (Barbalet, 1999). Van Tilburg and Igou (2012, 2017a) demonstrated that perceiving a situation being meaningless is a distinct experiential component of boredom. In Van Tilburg and Igou (2011, 2017b), participants in the high boredom condition reported a greater sense of meaninglessness than those in the low boredom condition. Another group of researchers manipulated the sense of meaningfulness in their participants by asking them to recall a meaningless life event (Fahlman et al., 2009). The results indicated heightened level of state boredom, compared to those who recalled a meaningful life event. In addition, a panel data study by Anusic, Lucas, and Donnellan (2016) using a day reconstruction method indicated that activities associated with high levels of meaning, such as meditation, sports, and gardening, tended to be associated with relatively low levels of boredom. These findings converge to suggest that there is a closely interlocking relationship between boredom and meaning, and situational meaninglessness could therefore be a predictor of state boredom.

Chin et al. (2017) drew a different conclusion from their experience sampling data, however. Although they found that the probability of experiencing boredom varied across activities (e.g., high when studying and low when at the gym), the authors inferred that because the meaningfulness of these activities cannot be assumed to be different, the influence of meaningfulness on boredom is unsubstantiated. Without measuring the moment-to-moment perceived situational meaningfulness, however, the link between the two constructs remains an empirical question to be addressed.

Current Studies

Taken together, although some studies have suggested that perceived meaningfulness of a situation is a predictor of state boredom, thus far no empirical study has offered data that directly examine this link. Across two studies, we examined the relationship between perceptions of a situation and experienced boredom. Specifically, we tested if perceived meaninglessness of the situation causes state boredom. Furthermore, we also tested if the link between situational meaninglessness and state boredom existed above and beyond various other factors, such as boredom

proneness, personality factors, and sadness. Study 1 was a cross-sectional experimental study relying on participants' retrospective report of past incidences. Study 2 used experience sampling method to capture multiple real-life incidences across a seven-day period. In both studies, we hypothesized that appraised meaninglessness of a task was associated with reported state boredom. Conducting two separate studies allowed us to test our hypotheses with different methodology; a controlled experimental study and a more naturalistic experience sampling study. This approach allowed us to examine the link between boredom and meaning using approaches typically characterized by relatively high internal validity (Study 1) and relatively high external validity (Study 2).

Study 1

Study 1 served as an initial test of our prediction that state boredom is associated with perceived situational meaninglessness. To test this, participants recalled past boring experiences and evaluated these in terms of boredom, sadness, and situational meaninglessness. We compared these evaluations against evaluations of three other situations: situations that featured no boredom, situations that were engaging, and situations that were saddening. By comparing people's perceptions of boring situations against those three others we hypothesized that 1) boredom was characterized by situational meaninglessness, and 2) this association was specific to boredom in comparison to another form of negative affect, in this case sadness.

Method

Participants and design. One hundred and five people visiting a shopping mall of a large city (29 men, 76 women; $M_{\text{age}} = 33.94$, $SD = 17.48$) participated in a short paper-and-pencil study. The study had a between-subjects design with four conditions (boredom vs. no boredom vs. engagement vs. sadness).

Procedure and materials. Participants were seated in a café and were given a short paper-and-pencil questionnaire entitled "feelings and emotions." After participants gave their informed consent and reported demographic information, we randomly assigned them to one of the four conditions. Specifically, they either described a situation in which they experienced boredom, no

boredom, experienced sadness, or felt engaged. Participants then responded to the questions “How bored did you feel during this situation?” and “How sad did you feel during this situation?” on 7-point Likert scales (1 = *not at all*, 7 = *very much*). We then measured the meaninglessness of this described situation by having participants indicate the extent to which this situation was meaningless, purposeless, senseless, valueless, and insignificant (1 = *not at all*, 7 = *very much*; Van Tilburg & Igou, 2012).

Ethics. Participants’ consents were obtained prior to their taking part in the study.

Participants received a (non-alcoholic) beverage at a local café in exchange for participating in the study. Ethical approval was received from the [masked for review] prior to data collection.

Results

State boredom. A one-way ANOVA indicated significant differences in levels of boredom, $F(3, 101) = 33.81, p < .001, \eta^2 = .50$. Boredom was higher in the boring situations ($M = 6.05, SD = 0.71$) compared to no boredom situations ($M = 1.54, SD = 1.37$), sad situations ($M = 2.03, SD = 1.63$), and situations in which participants felt engaged ($M = 2.16, SD = 2.30$), all $ps < .001$. The latter three conditions did not differ significantly ($ps > .17$).

State sadness. Sadness significantly differed across situations, $F(3, 101) = 32.38, p < .001, \eta^2 = .49$. More sadness was experienced in the sad situations ($M = 6.15, SD = 1.44$) compared to the boredom situations ($M = 2.63, SD = 1.67$), the no boredom situations ($M = 1.64, SD = 1.79$), and the engagement situations ($M = 3.16, SD = 2.54$), all $ps < .001$. More sadness was present in the engagement compared to the no boredom situations, $t(101) = 2.93, p < .01, d = 0.58$, and sadness was higher in the boredom compared to the no boredom situations, $t(101) = 1.77, p = .08, d = 0.35$. The boredom and engagement situations did not differ significantly ($t < 1$).

Situational meaninglessness. We computed average scores on the perceived meaninglessness items (internal consistency: $\alpha = .93$). We found significant differences in the perceived meaninglessness of the situation, $F(3, 100) = 15.15, p < .001, \eta^2 = .31$. Boring situations were perceived as more meaningless ($M = 4.75, SD = 1.91$) compared to sad situations ($M = 2.69, SD$

= 1.72), situations that did not involve boredom ($M = 1.84$, $SD = 1.38$), and situations that felt engaging ($M = 1.82$, $SD = 1.50$), all $ps < .001$. Thinking of sad situations yielded higher meaningfulness compared to the engaging situation, $t(100) = 2.01$, $p = .05$, $d = 0.40$, and situations without boredom, $t(100) = 2.01$, $p = .05$, $d = 0.40$; these latter two did not differ significantly from each other ($t < 1$).

We additionally tested whether boring event were characterized by meaningfulness above and beyond the sadness potentially associated with these events. We tested this by including sadness as covariate in an ANCOVA. The recalled experiences still affected perceived meaningfulness, $F(3, 99) = 15.06$, $p < .001$, $\eta^2 = .31$. Also, the correlation between boredom and meaningfulness of the situation ($r = .57$, $p < .001$) remained significant after controlling for sadness ($r_p = .83$, $p < .001$).

Discussion

The results of this study indicate, as hypothesized, that state boredom was associated with situational meaningfulness. In addition, this association occurred after controlling for another, presumably more general, form of negative affect: sadness. That is, the increase in meaningfulness as a function of boredom was essentially unrelated to sadness. The finding that the link between state boredom and meaningfulness exists independently of sadness is important as it illustrates that boredom's association with meaningfulness is not just representing any form of negative affect but rather seems to be especially pronounced for state boredom. It remains unclear, however, whether one feels bored in any given moment is because he or she is prone to feel bored, or whether the situational perceived lack of meaning predicts boredom above and beyond their boredom proneness. Study 2 was designed to investigate this.

Study 1 relied on recalled experiences, and this recall may not result in entirely correct representations of these past events. Indeed, negative features of memories tend to be forgotten over time (Ritchie, Batteson, Bohn et al., 2015). This may have added some measurement error to the estimated relationship between boredom, meaningfulness, and sadness. Study 2 instead relied on an

experience sampling approach, increasing the accuracy of participants' responses and offering a window into boredom experiences during the course of real-life.

Study 2

We conducted Study 2 to examine the relationship between state boredom and perceived meaning using a seven-day, multiple-times per day, experience-sampling method. We hypothesized that perceived situational meaning was associated with state boredom, even after controlling for sadness and boredom proneness. Several studies have investigated the relationship between boredom proneness and personality constructs. Boredom proneness was found to be negatively correlated with extraversion, agreeableness, conscientiousness, honesty/humility, and openness to experience (Culp, 2006; Hunter, Abraham, Hunter, Goldberg, & Eastwood, 2016) and positively with neuroticism (Mercer-Lynn, Flora, Fahlman, & Eastwood, 2013). As such, we estimated the relationship between boredom and situational meaninglessness before and after controlling for personality in this study. Furthermore, because people tend to feel more bored during the week (Chin et al., 2017), we also added weekday versus weekend as a covariate. Finally, we explored whether or not the activity was done with others as a potential moderator.

Boredom and Aloneness

Boredom and loneliness appear to be related but sufficiently different affective states. Yet, studies have found that people tend to feel bored when they are alone. Van Tilburg and Igou (2012), for example, found that being alone was a frequently described situational characteristic of boredom experiences. According to Anusic et al. (2016), activities that are generally done alone, such as relaxing and watching TV, tended to be associated with high levels of boredom. The findings of a recent large-scale experience-sampling study also supported this, showing that participants were more likely to report boredom when they were alone (Chin et al., 2017). These emerging results suggest an association between boredom and aloneness. Interestingly, Chin et al. (2017) found that their participants, other than when being alone, also reported boredom when they were with strangers or with coworkers, but not with children, spouse, partner or friends. This suggests that simply being with

others does not necessarily make one less bored—whom a person spent time with and the relationship between them also matter.

In the current study, we were interested in examining whether aloneness was indeed associated with higher levels of situational boredom. As Chin et al. (2017) demonstrated, in addition to feeling bored while alone, people can also feel bored in social situations. Specifically, they found that social situations with strangers or co-workers are more conducive to boredom. This may be due to the relative lack of perceived meaning in such situations. In line with this notion, Anusic et al. (2016) noted that activities that are typically done alone tended to be associated with high boredom ratings as well as relatively low meaning ratings; whereas activities such as taking care of children and socializing with friends tended to be associated with low boredom ratings as well as relatively high meaning ratings. We therefore suggest that the feeling of boredom in a social situation depends on the perceived meaningfulness of the situation. Situations that are appraised as meaningful would be construed as less boring in the presence of others; situations that are appraised as meaningless would be more boring in the presence of others. In this study, we examined the main effect of the presence of others as well as its interaction with situational meaningfulness on state boredom.

In sum, in this experience-sampling study, we hypothesized that situational meaningfulness would be associated with state boredom, controlling for boredom proneness, situational sadness, personality, and weekday vs. weekend; we further hypothesized that this association would be moderated by whether one was alone or with other people.

Method

Participants and design. The sample of this experience sampling study included 242 participants recruited from [masked for review] through an online portal and through campus-wide email. The study consisted of two Phases. Phase 1 collected baseline data on a number of traits and demographic information. Phase 2 was a 7-day experience sampling using a smartphone app. All participants participated in Phase 1, and 148 participants (61.1%) completed Phase 2. Over half of the participants were female (73.0%). The average age was 19.2 years ($SD = 1.8$).

Procedure and materials.

Phase 1. Participants were invited to the lab to complete a set of questionnaires through an online platform. Participants supplied baseline data including demographic information and trait measures.

Boredom proneness. Boredom proneness was measured with the 28-item Boredom Proneness Scale (BPS; Farmer & Sundberg, 1986). Participants rated items on a 7-point Likert scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Sample items include “it takes more stimulation to get me going than most people” and “I am often trapped in situations where I have to do meaningless things”. Higher composite scores indicate higher boredom proneness. Cronbach’s alpha was .78.

Big Five Personality. Personality was measured by the 10-item Big Five Personality Inventory (BFI-10; Rammstedt & John, 2007). The scale measures 5 dimensions of personality (openness, conscientiousness, extraversion, agreeableness, and neuroticism) with two items each. Participants rated items on a 7-point Likert scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Spearman-Brown coefficients ranged from .24 to .61.

Upon completing the questionnaire, participants were assisted by a researcher to install a smartphone app called Personal Analytics Companion (PACO; Baxter, Avrech, & Evans, 2015) and were given instructions about the experience sampling in Phase 2.

Phase 2. Participants received at least 5 notifications per day from the PACO app over 7 consecutive days after Phase 1. Notifications occurred at random time intervals between 10am to 8pm. All notifications directed the participants to fill out a brief questionnaire regarding their current affect and activity. Specifically, participants reported their state boredom (i.e., to what extent they are feeling bored right now), situational sadness (i.e., to what extent they are feeling sad right now), whether they are currently alone or with people, their activity immediately before filling in the survey, and the perceived meaningfulness of that activity. State boredom, situational sadness, and perceived meaningfulness of the activity were rated on a 7-point Likert scale ranging from 1 (*not at all*) to 7 (*extremely*), whereas being with people was a binary selection (i.e., “with people” or “alone”). If

participants were found to show difficulties with filling in the experience sampling or if they could not fulfill the basic requirement of 3 entries per day for any reason, a reminder email was sent to invite the participant to continue participating the experience sampling.

Ethics. Participants' consents were obtained prior to Phase 1. Upon completion of the study, participants were either provided with course credit or a one-in-fifteen chance lucky draw for cash coupons. Ethical approval was received from [masked for review] prior to data collection.

Statistical Analysis. All statistical analysis was performed with *R*. Accounting for the nested data structure, item-level z-scores, and multi-level modelling were applied to data analysis. Individual average and standard deviation of state boredom was calculated across all time points for each participant. Subsequently, the z-score of state boredom was generated. This item-level z-scores accounted for the within-person variability when comparing state boredom score for different activities.

Multilevel modeling (MLM) data analysis techniques were used to account for the nested structure of the data with 3,022 data points within 148 people using the *lme4* package (Bates, Maechler, Bolker, & Walker, 2014) in *R*.

Results

The state boredom rating of each activity is reported in Table 1. Participants reported lowest state boredom scores while interacting with somebody face-to-face ($\mu_z = -.37$) and exercising ($\mu_z = -.28$). Meanwhile, only three activities were rated positive in the z-scores. Studying/working was rated the highest ($\mu_z = .18$), followed by using phone for entertainment ($\mu_z = .06$) and sleeping/resting ($\mu_z = .03$). The positive mean z-scores indicated an above average rating in state boredom within each participant across the whole sample.

The intra-class correlations (ICCs) in the unconditional model for state boredom and perceived meaningfulness of the activity were $r = .35$ and $r = .33$, $ps < .001$, respectively, indicating acceptable variability in both measures. As the ICCs were calculated in the intercept-only model, this

reflected that 65% of the variability in state boredom and 67% of the variability in perceived meaningfulness of the activity were within persons. Means, standard deviations and correlations between trait measures, state boredom, situational sadness, and perceived meaningfulness of the activity are reported in Table 2. Boredom proneness was significantly positively correlated with weighted average state boredom, $r(133) = .30, p < .001$, and state boredom was significantly correlated with situational sadness, $r(3020) = .31, p < .001$, and perceived meaningfulness of the activity, $r(3020) = -.16, p < .001$.

MLM was used to test whether perceived meaningfulness of the activities predicts state boredom. Twenty-one participants (14.2%) had missing data at baseline and were excluded in the analysis, resulting in 127 participants in the final analysis. For the within-day effects using multilevel modeling we first compared a null (fixed intercept) model with the random intercept model. Subsequently, we compared the better fitting model with the random intercept and slope model. All models controlled for gender, age, boredom proneness and personality at Level 2, as well as weekend (vs. weekday), being with people (vs. alone), and situational sadness at Level 1. Chi-square difference tests indicated that the random slope models were significantly better fitting (Table 3). The 2-part equation for the best-fit model is given below:

$$StateBoredom_{ij} = \beta_{0j} + \beta_{1j} Meaningfulness + \epsilon_{ij}$$

$$\text{where } \beta_{0j} = \gamma_{00} + \mu_{0j} \text{ and } \beta_{1j} = \gamma_{01} + \mu_{1j}$$

In the analysis, $StateBoredom_{ij}$ was the dependent measure for time i on person j , and denotes the random slope between meaningfulness and state boredom. β_{0j} was the intercept of the regression equation for participants, β_{1j} was the main effect of meaningfulness of the activity, and ϵ_{ij} was the residual within participants. The γ s were the fixed regression coefficient and μ s were the residual between participants. Meaningfulness, $B = -0.145, p < .001, 95\% \text{ CI } [-0.206, -0.084]$, and situational sadness, $B = 0.189, p < .001, 95\% \text{ CI } [0.123, 0.261]$, were significant predictors of state boredom. Both boredom proneness, $B = 0.014, p = .019, 95\% \text{ CI } [0.002, 0.026]$, and extraversion, $B = 0.160, p = .003, 95\% \text{ CI } [0.058, 0.261]$, also significantly predicted state boredom. People with higher

boredom proneness and higher extraversion reported higher state boredom. Being with people was not a significant predictor of state boredom, $B = 0.126$, $p = .068$, 95% CI [-0.011, 0.260].

Boredom and aloneness. Subsequently, an interaction term between meaningfulness of the activity and aloneness at each moment was added to the model. The model with the interaction term was tested against the best-fit model in the prior analysis. Chi-square difference tests indicated that the model with the interaction term was significantly better fitting ($\Delta\chi^2 = 38.27$, $p < .001$). The 2-part equation for the model with interaction term is given below:

$$StateBoredom_{ij} = \beta_{0j} + \beta_{1j}Meaningfulness + \beta_{2j}Being\ with\ People + \beta_{3j}Meaningfulness*Being\ with\ People + \varepsilon_{ij}$$

$$\text{where } \beta_{0j} = \gamma_{00} + \mu_{0j}, \beta_{1j} = \gamma_{01} + \mu_{1j}, \beta_{2j} = \gamma_{02} + \mu_{2j} \text{ and } \beta_{3j} = \gamma_{03} + \mu_{3j}$$

In the analysis, β_3 was the within-participants interaction between meaningfulness of the activity and aloneness. The interaction term was found to be significant in the final model, $B = 0.108$, $p = .032$, 95% CI [0.007, 0.205].

Simple slope analysis revealed that meaningfulness of the activity was a significant negative predictor of state boredom regardless of being alone, $b = -0.08$, $p = .004$, or with others, $b = -0.20$, $p < .001$. That is, the higher situational meaning, the less a people experienced state boredom. When an individual is with others, however, situational meaningfulness comes with an even larger decrease in state boredom compared to an individual who is alone (see Figure 1).

Discussion

In this seven-day experience-sampling study, as hypothesized, perceived situational meaningfulness was associated with state boredom. This association was found to be above and beyond trait boredom, big-five personality traits, gender, situational sadness, and day of the week. We also found a significant interaction between perceived meaningfulness of the activity and being with

people on state boredom. The presence of others seemed to have amplified the association between perceived meaninglessness and state boredom.

The small positive association between trait and state boredom is consistent with prior studies (e.g., Mercer-Lynn et al., 2014). The fact that the predictive value of boredom proneness on state boredom was modest suggests the relative importance of situational factors (Mercer-Lynn et al., 2014). It is a long-held perspective that boredom can stem from the lack of meaning (Barbalet, 1999; Fahlman et al., 2009; Van Tilburg & Igou, 2012). Our study augments the growing literature evidence supporting the link between situational meaningfulness and situational boredom. Although we cannot draw a causal link between the two constructs, other experimental studies have suggested that the relationship may be dynamic and bidirectional (Fahlman et al., 2009; Van Tilburg & Igou, 2011) or that meaninglessness may be a central characteristic of boredom itself (Van Tilburg & Igou, 2017a, 2017b).

In our study, being alone versus with other people was not found to be associated with state boredom. Past studies have shown inconsistent results on this association; in some social situations people feel more bored than others (e.g., Chin et al., 2017). The appraised meaningfulness of the activity may be a moderator. Indeed, in this study, we found an interaction between perceived meaningfulness and being with people in predicting state boredom. One possible explanation is that being with other people changes the expectations one has for the activity. Generally speaking, human beings are gravitated towards social and shared experiences (Burger, 1995). Identifying with others, especially members of an ingroup, can help re-establish a sense of meaning (e.g., Castano, Yzerbyt, Paladino, & Sacchi, 2002; Greenberg, Solomon, & Pyszczynski, 1997) and reduce the sense of boredom (Van Tilburg & Igou, 2011). Perhaps our *expectations* for meaningfulness are increased when we are with others, compared when are alone. When the lived experience falls short of our expectations, the resulting disappointment—in this case boredom—is magnified.

Another possible explanation is the contagion of boredom in a social setting. That is, we suspect that viewing others being bored in a relatively meaningless situation makes it even more

boring. Emotional contagion is a well-established phenomenon (Hatfield, Cacioppo, & Rapson, 1994), yet to our knowledge no work has been done on boredom in particular.

Being with others may modulate boredom by increasing or limiting excitement. Thus, there may be an overall impact of others on boredom. Yet, spending time with people who we value (e.g., children, spouse, partner, friends) usually involves meaningful activities or connections. As a result, boredom ought to decrease when those people are around, and this reduction in boredom should be mediated by the meaning these people bring into the situation. Future studies can explore the aforementioned possibilities.

A limitation of Study 2 was that due to the need to keep the experience sampling questionnaire brief, we had very limited information about the nature of relationship with those present in the given activity the participants were engaging in. We did not know, for example, whether the activity was engaged in collectively (e.g., playing sports together) or was the activity simply done in the presence of other people (e.g., attending a lecture).

Second, our study participants were from a convenient sample of college students, who may experience boredom more often than other populations (Chin et al., 2017) and prefer not to be alone in order to avoid loneliness (Larson, Csikszentmihalyi, & Graet, 1982). This may limit the generalizability of our findings especially regarding the moderating effect of being with people.

General Discussion

Across two studies, we attempted to empirically establish the negative association between the meaningfulness of an experience and the level of boredom experienced. The results consistently suggested that the situations that are perceived as relatively meaningless are also the ones that elicit boredom experience. This relationship is above and beyond sadness (Studies 1 & 2) and personality traits and boredom proneness (Study 2). We further provide some initial evidence that being with other people in relatively meaningless situations can increase the level of situation boredom.

Our studies provide data that suggest that perception of the meaningfulness of a situation causes state boredom. As discussed above, this finding produced experimentally (Study 1) and in vivo (Study 2), is consistent with theories of boredom and earlier research (e.g., Barbalet, 1999). Importantly, corroborating previous findings, the effect appears to be independent of—or above-and-beyond—other psychological variables, including personality, boredom proneness, and other emotions. Our conclusion is inconsistent with Chin and colleagues (2017), which stated that perceived lack of meaning is not characteristic of state boredom. This discrepancy may be due to the fact that perceived meaningfulness was measured in our study and assumed in Chin et al. (2017). As perceived meaningfulness of an activity is arguably idiosyncratic and circumstantial, our approach may be more robust and thus provides a more reliable evidence of its association with state boredom.

It should be noted that although we found a consistent, inverse relationship between situational meaningfulness and state boredom, the effect sizes were small. This suggests that there might be other, unaccounted for, factors that are contributing or causing state boredom. Other researchers have proposed alternative models, such as lack of regulatory fit (Struk, Scholer, & Danckert, 2015), opportunity cost evaluation (Kurzban, Duckworth, Kable, & Myers, 2013), and maximization of subjective experience (Gomez-Ramirez & Costa, 2017). Although meaning appraisal and these other proposed models are conceptually related (e.g., an activity is appraised as less meaningful because other competing tasks seem to be more worthwhile), more work is needed in terms of clarifying the antecedents of boredom. Furthermore, the causality inferred from the current studies would need to be corroborated by additional experimental results.

Future studies may seek to further examine the potential dynamic nature of the relationship between perceived meaningfulness and boredom. It remains a possibility that the casual relationship is bidirectional. Furthermore, our participants were from affluent and industrialized regions ([masked for review]), arguably with relatively more opportunities to question the meaningfulness of their activities and higher expectation to not feel bored (Svendsen, 2005). Cross-cultural studies should be conducted to examine whether the link is equally robust in other parts of the world.

Given that boredom is found to be associated with a host of undesirable outcomes, including academic performance (Pekrun, Goetz, Daniels, Stupnisky, & Perry, 2010), our results should help encourage educators to identify means to reduce boredom by increasing students' perceived meaningfulness of their learning activities, especially those that are engaged in collectively. Indeed, Nett and his colleagues (2010) found that students who coped with boredom by reappraising the importance of the lesson experienced boredom less frequently in class. They argued that this type of coping strategy is effective in reducing boredom because it may help increase the perceived value of the situation. Future research is also needed to examine the detailed features of the situations that are interpreted as meaningless and potential moderators.

Study 1 indicated that sadness also involved some level of perceived meaninglessness, albeit not as prominent as for boredom. How does boredom differ from sadness? Other studies that examined this question (e.g., Van Tilburg & Igou, 2012; 2017a) suggest that there are a number of differences between boredom and sadness. First, boredom is much more prominently associated with a lack of meaning and the subsequent search for meaning than these other states. In addition, boredom is especially associated with a lack of perceived purpose (teleological meaning; Van Tilburg & Igou, 2013). Other differences between these states include that boredom, different from sadness, involves a deeply felt lack of challenge and attentional disengagement.

In our present investigation we did not examine how boredom may relate to depression, which also involves a lack of perceived meaning (e.g., Steger, Frazier, Oishi, & Kaler, 2006). Indeed, several studies show a correlation between depression and individual differences in boredom proneness (see Vodanovich, 2003), yet, this association has hardly been studied. We speculate that the lack of meaning associated with boredom may be the key element that binds these two phenomena. In particular, perhaps prolonged, chronic, and unresolved experiences of boredom may eventually contribute to the development of depression. This remains of course an empirical question and we encourage future research to examine this link.

Conclusion

Boredom is a ubiquitous experience distinctive from other emotions. Employing different methods, our two studies converged to suggest that people tend to feel bored when they perceive what they are doing as meaningless. This association between boredom and meaninglessness emerges above and beyond sadness, various personality traits, and individual differences in boredom proneness. These results emphasize the central role of perceived meaninglessness as characteristic of state boredom.

References

- Altschule, M. D. (1965). Acedia: Its evolution from deadly sin to psychiatric syndrome. *The British Journal of Psychiatry*, 111(471), 117-119.
- Anusic, I., Lucas, R. E., & Donnellan, M. B. (2016). The validity of the day reconstruction method in the German socio-economic panel study. *Social Indicators Research*, 1(130), 213-232.
- Barbalet, J. M. (1999). Boredom and social meaning. *The British journal of sociology*, 50(4), 631-646.
- Bates, D., Maechler, M., Bolker, B., & Walker, S. (2014). Lme4: Linear mixed-effects models using eigen and S4 (R package version1).
- Baxter, K. K., Avrekh, A., & Evans, B. (2015, April). Using experience sampling methodology to collect deep data about your users. In *Proceedings of the 33rd Annual ACM Conference Extended Abstracts on Human Factors in Computing Systems* (pp. 2489-2490). ACM.
- Burger, J. M. (1995). Individual differences in preference for solitude. *Journal of Research in Personality*, 29(1), 85-108.
- Castano, E., Yzerbyt, V., Paladino, M., & Sacchi, S. (2002). I belong, therefore, I exist: Ingroup identification, ingroup entitativity, and ingroup bias. *Personality and Social Psychology Bulletin*, 28(2), 135-143.
- Chin, A., Markey, A., Bhargava, S., Kassam, K. S., & Loewenstein, G. (2017). Bored in the USA: Experience sampling and boredom in everyday life. *Emotion*, 17(2), 359-368.
- Coughlan, G., Igou, E. R., Van Tilburg, W. A. P., Kinsella, E. L., & Ritchie, T. D. (2017). On boredom and the perceptions of heroes: A meaning-regulation approach to heroism. *Journal of Humanistic Psychology*. doi:10.1177/0022167817705281
- Culp, N. A. (2006). The relations of two facets of boredom proneness with the major dimensions of personality. *Personality and Individual Differences*, 41, 999-1007.

- Eastwood, J. D., Frischen, A., Fenske, M. J., & Smilek, D. (2012). The unengaged mind defining boredom in terms of attention. *Perspectives on Psychological Science*, 7(5), 482-495.
- Elpidorou, A. (2014). The bright side of boredom. *Frontiers in Psychology*, 5, 1245.
- Fahlman, S. A., Mercer-Lynn, K. B., Flora, D. B., & Eastwood, J. D. (2013). Development and validation of the multidimensional state boredom scale. *Assessment*, 20(1), 68-85.
- Fahlman, S. A., Mercer, K. B., Gaskovski, P., Eastwood, A. E., & Eastwood, J. D. (2009). Does a lack of life meaning cause boredom? Results from psychometric, longitudinal, and experimental analyses. *Journal of social and clinical psychology*, 28(3), 307-340.
- Farmer, R., & Sundberg, N. D. (1986). Boredom proneness--the development and correlates of a new scale. *Journal of personality assessment*, 50(1), 4-17.
- Fisher, C. D. (1993). Boredom at work: A neglected concept. *Human Relations*, 46(3), 395-417.
- Gerritsen, C. J., Toplak, M. E., Sciaraffa, J., & Eastwood, J. (2014). I can't get no satisfaction: Potential causes of boredom. *Consciousness and Cognition*, 27, 27-41.
- Goldberg, Y. K., Eastwood, J. D., LaGuardia, J., & Danckert, J. (2011). Boredom: An emotional experience distinct from apathy, anhedonia, or depression. *Journal of Social and Clinical Psychology*, 30(6), 647-666.
- Gomez-Ramirez, J., & Costa, T. (2017). Boredom begets creativity: A solution to the exploitation-exploration trade-off in predictive coding. *Biosystems*, 162, 168-176.
- Greenberg, J., Solomon, S., & Pyszczynski, T. (1997). Terror management theory of self-esteem and cultural worldviews: Empirical assessments and conceptual refinements. *Advances in Experimental Social Psychology*, 29, 61-139.
- Greenson, R.R. (1953). On boredom. *Journal of the American Psychoanalytic Association*, 1(1), 7-21.

- Hatfield, E., Cacioppo, J. T., & Rapson, R. L. (1994). Emotional contagion: Cambridge studies in emotion and social interaction. *Cambridge, UK: Cambridge University Press. errors-in-variables regression model when the variances of the measurement errors vary between the observations. Statistics in Medicine, 21*, 1089-1101.
- Hunter, J. A., & Eastwood, J. D. (2016). Does state boredom cause failures of attention? Examining the relations between trait boredom, state boredom, and sustained attention. *Experimental Brain Research, 1-10*.
- Hunter, J. A., Abraham, E. H., Hunter, A. G., Goldberg, L. C., & Eastwood, J. D. (2016). Personality and boredom proneness in the prediction of creativity and curiosity. *Thinking Skills and Creativity, 22*, 48-57.
- Kurzban, R., Duckworth, A., Kable, J. W., & Myers, J. (2013). An opportunity cost model of subjective effort and task performance. *Behavioral and Brain Sciences, 36*(6), 661-679.
- Isacescu, J., Struk, A. A., & Danckert, J. (2016). Cognitive and affective predictors of boredom proneness. *Cognition and Emotion, 23*, 1-8.
- Larson, R., Csikszentmihalyi, M., & Graef, R. (1982). Time alone in daily experience: Loneliness or renewal. *Loneliness: A sourcebook of current theory, research and therapy, 40-53*.
- Martin, M., Sadlo, G., & Stew, G. (2006). The phenomenon of boredom. *Qualitative Research in Psychology, 3*, 193-211.
- Mercer-Lynn, K. B., Bar, R. J., & Eastwood, J. D. (2014). Causes of boredom: The person, the situation, or both? *Personality and Individual Differences, 56*, 122-126.
- Mercer-Lynn, K. B., Flora, D. B., Fahlman, S. A., & Eastwood, J. D. (2013). The measurement of boredom: differences between existing self-report scales. *Assessment, 20*(5), 585-596.
- Mercer-Lynn, K. B., Hunter, J. A., & Eastwood, J. D. (2013). Is trait boredom redundant?. *Journal of Social and Clinical Psychology, 32*(8), 897-916.

- Merrifield, C., & Danckert, J. (2014). Characterizing the psychophysiological signature of boredom. *Experimental brain research*, 232(2), 481-491.
- Mikulas, W.L., & Vodanovich, S.J. (1993). The essence of boredom. *The Psychological Record*, 43(1), 3-12.
- Nett, U. E., Goetz, T., & Daniels, L. M. (2010). What to do when feeling bored?: Students' strategies for coping with boredom. *Learning and Individual Differences*, 20(6), 626-638.
- Neu, J. (1998). Boring from within. *Emotions in psychopathology: Theory and research*, 158-170.
- Ng, A. H., Liu, Y., Chen, J. Z., & Eastwood, J. D. (2015). Culture and state boredom: A comparison between European Canadians and Chinese. *Personality and Individual Differences*, 75, 13-18.
- O'Connor, D. (1967). The phenomena of boredom. *Journal of Existentialism*, 7(27), 381-399.
- O'Hanlon, J.F., (1981). Boredom: Practical consequences and a theory. *Acta Psychologica*, 49(1), 53-82.
- Parkhurst, J. T., & Hopmeyer, A. (1999). Developmental change in the sources of loneliness in childhood and adolescence: Constructing a theoretical model. In K. J. Rotenberg & S. Hymel (Eds.), *Loneliness in childhood and adolescence* (56-59). New York: Cambridge University Press.
- Pekrun, R., Goetz, T., Daniels, L. M., Stupnisky, R. H., & Perry, R. P. (2010). Boredom in achievement settings: Exploring control–value antecedents and performance outcomes of a neglected emotion. *Journal of Educational Psychology*, 102, 531-549.
- Rammstedt, B. & John, O. P. (2007). Measuring personality in one minute or less: A 10-item short version of the Big Five Inventory in English and German. *Journal of Research in Personality*, 41, 203-212.
- Ritchie, T. D., Bateson, T. J., Bohn, A., Crawford, M. T., Ferguson, G. V., Schrauf, R. W., Vogl, R. J., & Walker, W. R. (2015). A pancultural perspective on the fading affect bias in

- autobiographical memory. *Memory*, 23, 278-290.
- Svendsen, L. (2005). *A Philosophy of Boredom* (J. Irons, Trans.). London: Reaktion.
- Smith, C. A., & Ellsworth, P. C. (1985). Patterns of cognitive appraisal in emotion. *Journal of Personality and Social Psychology*, 48(4), 813-838.
- Steger, M. F., Frazier, P., Oishi, S., & Kaler, M. (2006). The meaning in life questionnaire: Assessing the presence of and search for meaning in life. *Journal of Counseling Psychology*, 53, 80-93.
- Struk, A. A., Scholer, A. A., & Danckert, J. (2016). A self-regulatory approach to understanding boredom proneness. *Cognition and Emotion*, 30(8), 1388-1401.
- Van Tilburg, W. A., & Igou, E. R. (2011). On boredom and social identity: A pragmatic meaning-regulation approach. *Personality and Social Psychology Bulletin*, 37(12), 1679-1691.
- Van Tilburg, W. A., & Igou, E. R. (2012). On boredom: Lack of challenge and meaning as distinct boredom experiences. *Motivation and Emotion*, 36(2), 181-194.
- Van Tilburg, W. A., & Igou, E. R. (2013). On the meaningfulness of behavior: An expectancy x value approach. *Motivation and Emotion*, 37, 373-388. doi: 10.1007/s11031-012-9316-3
- Van Tilburg, W. A., & Igou, E. R. (2017a). Boredom begs to differ: Differentiation from other negative emotions. *Emotion*, 17(2), 309-322.
- Van Tilburg, W. A., & Igou, E. R. (2017b). Can boredom help? Increased prosocial intentions in response to boredom. *Self and Identity*, 16(1), 82-96.
- Vodanovich, S. J. (2003). Psychometric measures of boredom: A review of the literature. *Journal of Psychology*, 137, 569-595.
- Wallbott, H. G. (1998). Bodily expression of emotion. *European journal of social psychology*, 28(6), 879-896.

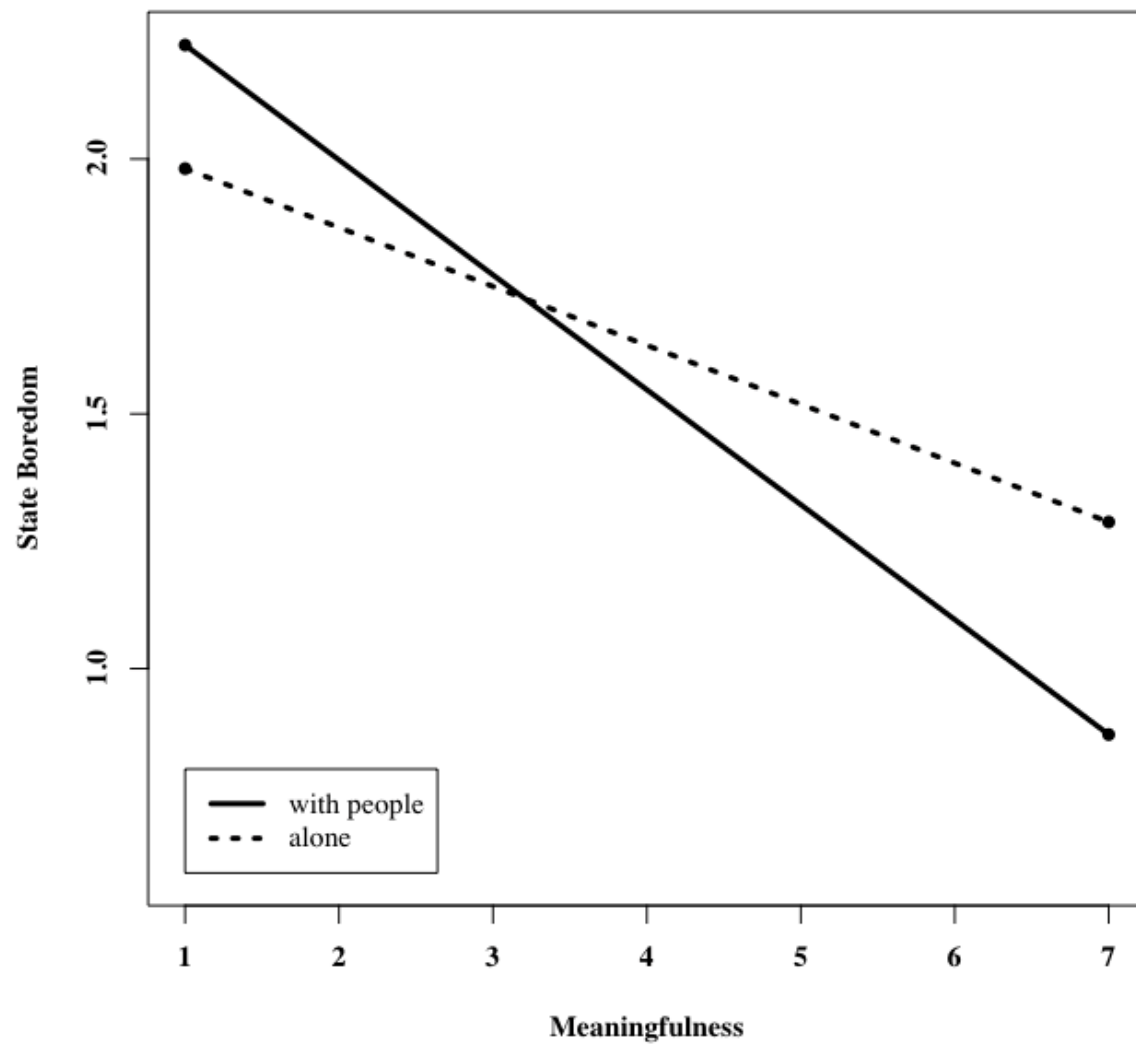


Figure 1. Simple slopes of perceived meaningfulness predicting state boredom while alone and while with people (Study 2)

Table 1. *Study 2: State boredom rating in different activities (n = 148; total entries = 3022).*

Activities	<i>n</i>	Number of entries	Base Rate (%)	μ_z	SD_z
Interacting with someone face-to-face	115	432	14.30	-0.37	0.92
Interacting with someone using your phone / smartphone	96	264	8.74	-0.01	0.95
Using your phone for entertainment	126	403	13.34	0.06	0.94
Using your phone for study / work / information	67	138	4.57	-0.05	1.04
Studying / Working	143	1014	33.55	0.18	0.95
Sleeping / Resting	97	242	8.01	0.03	0.98
Eating / Drinking	92	231	7.64	-0.08	1.02
Exercising	31	47	1.56	-0.28	0.98
Doing errands / chores	45	80	2.65	-0.16	0.82
Others	58	171	5.66	-0.02	1.04

Table 2. Study 2: Means, standard deviations and correlations between trait measures, state boredom and perceived meaningfulness.

	<i>M</i> (<i>SD</i>)	1.	2.	3.	4.	5.	6.	7.	8.
1. Boredom Proneness	105.13 (16.74)								
2. Extraversion	5.79 (1.73)	-.21*							
3. Agreeableness	7.25 (1.42)	-.36***	.12						
4. Conscientiousness	5.91 (1.64)	-.26**	.10	.29***					
5. Neuroticism	6.58 (1.96)	.38***	-.21*	-.23**	-.10				
6. Openness	6.77 (1.99)	-.28**	.29***	.06	-.09	-.03			
7. State Boredom ^a	2.96 (1.10)	.30***	.11	-.21*	-.13	.00	-.05		
8. Situational Sadness ^a	2.54 (1.03)	.29***	.02	-.22**	-.17	.13	-.01	.31***	
9. Perceived Meaningfulness ^a	4.32 (0.90)	-.09	.03	.03	.16	-.03	.23**	-.16***	-.06***

Note. ^aExcept between state boredom, situational sadness, and perceived meaningfulness, correlations are aggregated daily means within participant.

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 3. *Study 2: Chi-square difference tests between MLM models.*

	<i>df</i>	deviance	<i>AIC</i>	<i>BIC</i>	$\Delta\chi^2$	$\Delta\delta\phi$	<i>p</i>
fixed intercept (null)	23	9410.9	9456.9	9592.5			
random intercept model (RI)	24	9356.9	9404.9	9546.4	53.99	1	<.001
random intercept & random slope model (RIRS)	29	9308.0	9366.0	9536.9	49.00	5	<.001
RIRS model with interaction term	36	9269.7	9341.7	9553.9	38.27	7	<.001